CLAIMS

The invention claimed is:

1. A method of forming a patterned composition over a substrate, comprising:

providing a substrate having at least a pair of separated photoresist features thereover;

exposing at least a portion of at least one of the separated photoresist features to actinic radiation to release a substance from the photoresist;

forming a layer of material over the photoresist features and over a gap between the separated photoresist features, the material having a solubility in a solvent which is reduced when the material interacts with the substance released from the photoresist; and

exposing the layer of material to the solvent to remove a portion of the material which is not proximate to the photoresist selectively relative to a portion of the material which is proximate to the photoresist.

2. The method of claim 1 wherein the photoresist is a chemically-amplified photoresist, and wherein the released substance is the chemical utilized for the chemical amplification.

3. The method of claim 1 wherein the exposure to the actinic radiation comprises exposure to a variable dose of the actinic radiation.

4. The method of claim 1 wherein only one of the separated photoresist features is exposed to the actinic radiation.

5. The method of claim 1 wherein only a portion of only one of the separated photoresist features is exposed to the actinic radiation.

6. The method of claim 1 wherein both of the separated photoresist features are exposed to the actinic radiation.

7. The method of claim 1 wherein both of the separated photoresist features are exposed to the actinic radiation, and wherein only a portion of both separated photoresist features is exposed to the actinic radiation.

8. The method of claim 1 wherein the exposure to the actinic radiation occurs after the forming of the material over the photoresist features.

9. The method of claim 1 wherein the exposure to the actinic radiation occurs prior to the forming of the material over the photoresist features.

10. The method of claim 1 wherein the substance released from the photoresist is a photogenerated acid.

11. A method of forming a patterned composition over a substrate, comprising:

providing a substrate having photoresist thereover, the photoresist being in a pattern comprising at least a pair of physically separate features;

exposing a region of the photoresist to actinic radiation to alter at least one property of the photoresist within the region;

forming a layer of material over the features and over a gap between the features, the material having a solubility in a solvent which is reduced when the material is proximate to photoresist having the at least one altered property relative to when the material is not proximate to photoresist having the at least one altered property; and

exposing the layer of material to the solvent to remove a portion of the material which is not proximate to the region of the photoresist selectively relative to a portion of the material which is proximate to the region of the photoresist.

12. The method of claim 11 wherein the exposure to the actinic radiation comprises exposure to a variable dose of the actinic radiation.

13. The method of claim 11 wherein the exposure to the actinic radiation occurs after the forming of the layer of material.

14. The method of claim 11 wherein the exposure to the actinic radiation occurs prior to the forming of the layer of material.

15. The method of claim 11 wherein the photoresist is a chemically-amplified photoresist, and wherein the at least one altered property of the photoresist includes release of the chemical utilized for the chemical amplification.

16. The method of claim 11 wherein:

the photoresist is a chemically-amplified photoresist;

the chemical utilized for the amplification is a photogenerated acid;

the at least one altered property of the photoresist includes release of the photogenerated acid;

the material and photoresist are subjected to a bake at a temperature from about 100°C to about 120°C to diffuse the photogenerated acid from the exposed region of the photoresist into the material; and

the photogenerated acid induces crosslinks within the material.

17. The method of claim 11 wherein the photoresist is a positive photoresist.

18. The method of claim 11 wherein the photoresist is a negative photoresist.

19. A method of forming a patterned composition over a substrate, comprising:

photolithographically forming a plurality of discrete photoresist features over the substrate, the photoresist features being separated from one another by gaps;

exposing at least some of the discrete photoresist features to actinic radiation to release one or more substances from the photoresist of the discrete photoresist features;

forming a layer of material over the discrete photoresist features and over the gaps between the photoresist features, the material having a solubility in a solvent which is reduced when the material interacts with at least one of the substances released from the photoresist; and

exposing the layer of material to the solvent to remove portions of the material which do not contact the photoresist selectively relative to portions which do contact the photoresist.

20. The method of claim 19 wherein only some of the discrete photoresist features which are over the substrate are exposed to the actinic radiation.

21. The method of claim 19 wherein all of the discrete photoresist features which are over the substrate are exposed to the actinic radiation.

22. The method of claim 19 wherein the exposure to the actinic radiation occurs after the forming of the material over the discrete photoresist features.

23. The method of claim 19 wherein the exposure to the actinic radiation occurs prior to the forming of the material over the discrete photoresist features.

24. The method of claim 19 wherein the at least one substance released from the photoresist and which interacts with the material is a proton of a photogenerated acid.

25. A method of forming a patterned composition over a substrate, comprising:

forming photoresist over the substrate;

subjecting the photoresist to patterned first actinic radiation to render a first region of the photoresist more soluble in a first solvent than a second region;

utilizing the first solvent to remove the first region of the photoresist while leaving the second region;

exposing at least some of the second region to second actinic radiation; the photoresist of the second region which is exposed to the second actinic radiation releasing a substance;

forming a material over the second region of the photoresist, the material being rendered less soluble in a second solvent through interaction with the substance; and

utilizing the second solvent to selectively remove a portion of the material which is not proximate to the photoresist that was exposed to the second actinic radiation relative to a portion of the material which is proximate to the photoresist that was exposed to the second actinic radiation.

26. The method of claim 25 wherein:

the second region of photoresist remaining after removal of the first region of photoresist comprises a plurality of discrete features;

only some of the discrete features are exposed to the second actinic radiation, the features exposed to the second actinic radiation being first features and the features not exposed to the second actinic radiation being second features; and

the material remaining after the exposure to the second solvent forms layers around all of the discrete features, with the layers being thicker over the first features than over the second features.

27. The method of claim 26 wherein the layers of the remaining material around the discrete features comprise chemical crosslinking therein.

28. The method of claim 26 wherein the second features have portions exposed to the second actinic radiation and portions not exposed to the second actinic radiation, and wherein the material remaining after the exposure to the second solvent is thicker over the portions of the second features exposed to the second actinic radiation than over portions of the second features that are not exposed to the second actinic radiation.

29. The method of claim 25 wherein only some of the second region is exposed to the second actinic radiation.

30. The method of claim 25 wherein all of the second region is exposed to the second actinic radiation.

31. The method of claim 25 wherein the exposure to the second actinic radiation occurs after the forming of the material.

32. The method of claim 25 wherein the exposure to the second actinic radiation occurs prior to the forming of the material.

33. The method of claim 25 wherein the substance released from the photoresist is a proton of a photogenerated acid.

34. The method of claim 25 wherein the photoresist is a positive photoresist.

35. The method of claim 25 wherein the photoresist is a negative photoresist.

36. The method of claim 25 wherein the second region comprises photoresist blocks having top surfaces and sidewall surfaces extending from the top surfaces to the substrate; wherein the blocks have upper portions proximate the top surfaces and lower portions beneath the upper portions; wherein the upper portions of the photoresist blocks are exposed to more of the second actinic radiation than lower portions; and wherein the material remaining after utilization of the second solvent is thicker on the top surfaces of the blocks and upper portions of the sidewall surfaces than along lower portions of the sidewall surfaces.

37. The method of claim 36 wherein the lower portions of the sidewall surfaces are not exposed to any of the second actinic radiation.

38. The method of claim 36 wherein a measurable thickness of the material remains on the lower portions of the sidewall surfaces after the utilization of the second solvent.

39. The method of claim 36 wherein the exposure to the second actinic radiation occurs after forming the material.

40. The method of claim 25 wherein the first actinic radiation induces some release of the substance and the second actinic radiation induces additional release of the substance.

41. The method of claim 25 wherein the first actinic radiation is light having a primary wavelength, and the second actinic radiation is light having the same primary wavelength as the first radiation.

42. The method of claim 25 wherein the first actinic radiation is light having a primary wavelength, and the second actinic radiation is light having a different primary wavelength than the first radiation.

43. The method of claim 25 wherein the first actinic radiation is provided to a first dose, and wherein the second actinic radiation is provided to a second dose different than the first dose.

44. The method of claim 25 wherein:

only some of the second region is exposed to the second actinic radiation;

the first actinic radiation induces some release of the substance and the second actinic radiation induces additional release of the substance;

the material remaining after the exposure to second solvent is a first thickness over portions of the second region which are not exposed to the second actinic radiation and is a second thickness over portions of the second region which have been exposed to the second actinic radiation;

the first thickness is greater than about 50Å; and

the second thickness is greater than the first thickness.